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Slow Down. A Sound (e)scape. A Sound idea for Life

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SLOW DOWN

A Sound (E)scape

by

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B.Ed (Secondary)

This exegesis and creative work is presented in partial fulfilment of the requirements for the degree of Master of Creative Industries (MCI)

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Key Words

Spatial audio; 360/ 3D audio; immersive audio; ambisonics; binaural; azimuth; elevation; distance, soundscape composition; field recordings, virtual reality (VR), VR headset & hand controllers; immersion; attentional demand; internal spherical listening space; sound objects; movement; practice-based research

Abstract

What are the possibilities of 360 audio to enhance the benefits of sound and music?

This paper and its accompanying audio piece explores the potential deepening of immersion through adding an attentional element via movement to the sounds and music in an audio soundscape. The paper will argue through literature review and reflection, and demonstrate through its audio content, that adding this spatial element to audio material gives the brain additional attentional anchors to follow and assists in deepening immersion as a result.

Why does immersion matter? Listening to music has multiple effects on the structural and functional arrangement of brain circuitry and new insights reveal that music therapy as a non-pharmacological intervention can assist with cognitive decline and to alleviate the symptoms of severe illnesses. Music is now known to change the chemistry of the brain, it evokes an emotional response, triggers memories and may lead to positive long term changes in brain neuroplasticity (Speranza, 2022, p. 796) . If a listening experience can have beneficial implications physically, mentally and emotionally then the more immersed in that experience one is the more potential benefit there could be.

The literature indicates, and this exegesis highlights, that spatial audio mixing techniques that allow the placement and movement of sounds around the 360 internal listening space have the potential to increase the immersed experience hence its use in the gaming sector for example. It made sense to me that it could also be a useful additional mixing technique not just for game

sound designers and sound installation artists but to the audio/medical professionals who work within the now established and recognised fields of medical hypnosis, virtual reality hypnosis, psychology and music therapy. If as this paper shows, the benefits of sound and music therapies in medical settings is now widespread, validated by statistics and increasing in its use then adding any element that can further deepen the benefits of helpful listening experiences is perhaps well worthy of creative consideration.

The Immersive Audio processes and skills used to realise experimentations and creative play with movement were learned while working towards the completion of a Masters in Creative Industry with the SAE. The soundscape that the accompanying research and experimentation informed endeavours to demonstrate the potential of adding movement to sounds to assist the listener to reach a place of 'musical asylum' and calm. The benefits and justifications for doing so are also explored throughout this paper's reviews and discussions.

This exegesis argues that giving the brain something additional to follow in addition to the sonic content and compositional changes assists to bring the listener's focus into the 'here and now' to a recognised state known as 'mindfulness'. The benefits of sound and music therapy, and of mindfulness practice are explored, as are justifications for presenting a piece that seeks to slow down, calm and relax the listener as a deeper metaphor for slowing down in our wider lives to assist in reducing our impact and increasing our simple contentment.

This paper will argue through its literature review and through reflections on the audio content, that adding the element of movement to sound

objects deepens the immersion of a 'time out' listening experience and thus has the potential to increase the benefits for the listener. The processes used to realise movement within this project's audio have been explained in the hope that others may find the knowledge and tools useful.

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Statement of Authenticity

The original work contained herein is that of Nicholas Blackman and has not previously been submitted for an award at any other higher education institution. To the best of my knowledge and belief, no material previously published or written by another person has been included except where due reference is made.

_____

Nicholas Blackman

26th May 2023

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Slow Down. A Sound (e)scape. A Sound idea for Life

In "Practice As Research'', Estelle Barrett (2007) states her belief that a key innovative potential for practice-based research is not only its ability to generate new knowledge for both the practitioner and reader, but that the work can at the same time reveal social, cultural and philosophical contexts for the externalising of that new knowledge (Barrett & Bolt, 2007, p. 2). In the chapter "The Exegesis as Meme'', Barrett (2007) likens the externalising of concepts and ideas beyond the created artefact itself into the wider zeitgeist to 'memes'. Barrett explores how such memes can be seen as building blocks of culture, ideas that can replicate and spread via any means, even simple communication (Barrett & Bolt, 2007, p. 159). In such a context, the Slow Down soundscape is not the meme itself, but a cultural artefact that has the potential to be a vehicle from which ideas and concepts can propagate.

The meme I have endeavoured to suggest via this paper's discussion and audio artefact, perhaps even just metaphorically, is that when listening to relaxing audio we can hopefully slow down and relax in the moment of listening. However, perhaps in recognising that slowing down is beneficial to us we might be more inclined to embrace it as a wider concept, as an alternate lived reality where it then becomes not only beneficial to us but also to others and to the flora and fauna and ecosystems with which we share this Earth and to which we are all interconnected.

In our modern western lives we swipe left and rush right at Virrilo's 'speed of light' (Featherstone, 2000, p.151, para. 4) sometimes just to keep up and I for one have always struggled finding the time and space to slow down. Yet others live within cultures and communities very different to our own and as such they experience themselves, each other and the world in which they live in different ways. Indigenous cultures in particular often have a cultural ancestry that lives more harmoniously and simply and intimately with each other and with the natural kingdom and cosmos to which we all belong. As world-renowned environmental thinker, activist & quantum physicist Dr. Vandana Shiva states:

> *Diversity is at the root of interconnectedness, diversity is at the root of freedom. The call out culture is denying diversity in humanity. The Divide and Rule culture in organised form is denying the true aspirations of particular individuals and different cultures* (Shiva,2022, para.38).

The colonial capitalist worldview that we as westerners inherit is conditioned upon us as well as imposed onto other cultures and their ways of knowing and as philosopher, poet and psychologist Dr. Bayo Akomalafe writes, "Slowly, the thrilling plurality of our many worlds is fading away under a monoculture of being" (Akomalafe, 2022, para. 3). Meanwhile our planetary home continues to to be presented as a mere object of resource development and profit. Our health and wellbeing has become privatised and drug dependent and we stress and we struggle to live in a simple peaceful heart felt joy as part of real community.

If we can slow down, step away and come together perhaps we will collectively minimise our environmental footprints and find more pleasure

from simply being and living more intimately with loved ones, community and the Earth. A simpler and kinder world for us all.

> *We know a way. Our cultures teach us that in turning to each other we become disruptive to old realities and hospitable to new ones. It is no longer time to rush through the contested world blinded by fury and anger – however worthwhile these are. Now, we think, is the time to 'retreat' into the real work of reclamation, to re-member again our humanity through the intimacy of our relationships. The time is very urgent – we must slow down* (Akomolafe, 2022, para. 12).

We must slow down, says Akomolafe. To remember our humanity through the intimacy of our relationships with others. Perhaps a soundscape that assists people to slow down in the moment could also become a metaphor, a meme, for slowing down in our lives. In the moment of listening we are attempting to slow down from our often busy, stressful and hectic daily toil. But perhaps the meme that might externalise from the piece is reflective of not so much something we need to slow down from but more somewhere we can collectively slow down too.

A place that celebrates the coming together of humanity to simply live, with a mutual respect for diversity and an understanding that there are other ways of being, other lived realities, other cultures with other ways of knowing and experiencing life that are just as valid perhaps more so than the prevalent colonial systems normalisation of a money focused capitalist worldview. We could remember and rediscover our interconnectedness. Not just with each other but with the whole to which we all belong. As Dr.Shiva remarks,

"Diversity is at the root of interconnectedness" (Shiva, 2022, para.38), as I also believe is music and art.

The 25 minute audio artefact that accompanies this exegesis is a soundscape comprising spoken word prompts, music and field recordings from nature with the intent of helping the listener to slow down and relax. In the Literature Review, insights are presented that illustrate how sound and music is beneficial to us and how it impacts us as a justification for attempting to create a 'sound asylum' for a listener. The review further explores the use of spatial audio mixing techniques and argues for its use in deepening the immersion of a listening experience.

It was my intention to create a soundscape that used guided voice prompts to assist the listener to relax. There are many such audios available that endeavour to do this and I myself have found solace and sanctuary when using such media many times over the years. I was intrigued to see what the literature could reveal about the possibilities of combining the movement and spatial location options of immersive audio techniques within a guided relaxation soundscape.

Before moving into the Literature Review it is perhaps pertinent here to elaborate on the difference between spatial /3D / Immersive / 360 audio and traditional stereo. Traditionally when mixing audio for playback, mixers and engineers refer to a perceived soundstage that sits in front of the listener (Moylan, p. 113). Upon this perceived sound stage, sonic elements are placed and efforts made to separate them within the mix. The parameters that the mix engineer attempts to manipulate to assist in this separation and give the song breadth, interest and clarity are frequency, placement left and right within the

stereo field, and proximity to the listener via volume adjustment and reverb use (Elmosino, 2018, p. 209).

With 3D audio we don't have a perceived stereo mixing stage in front of us, we have instead a spatial characteristic akin to a 'natural' sonic experience with a spherical quality, with the listener at its centre (Abrantes, 2019, p. 79). Composing in 3D audio means we are not confined to placing sounds within the boundary of the usual perceived sound stage, we can instead place and move them all around, left and right, up and down, in front and behind, replicating the natural sonic experience and creating a soundscape with a potentially limitless spherical horizon (Born, 2013, p. 14). The research question that the Literature Review explores is: can the movement of sounds add an additional attentional element to a listening experience and deepen immersion and benefit as a result.

<h1 style="text-align:center">Literature Review</h1>

The research question that inspired the creative work and thesis was; What are the possibilities of 360 audio to enhance the benefits of sound and music? Can adding spatial movement to sounds assist the listener to experience deeper immersion? This literature review explores research on the use of music and audio in medical settings where immersion matters. Discussion points include, what is happening to our brains when we listen to music?, can music affect us emotionally?, as well as research on technical and aesthetic points of consideration for the spatial 360 Audio composer.

'3D', '360 degree' or 'spatial audio' in this paper refers to the mixing and placing of sound elements in a sphere that can be imagined surrounding the listener's head (Narbutt, 2020, p. 2; Abrantes, 2019, p. 79). Erruz (2016) defines 3D audio as being all technologies designed for the recreation of a complete sound field around the listener (Erruz, 2016, p. 1). Erruz further notes that as a result of the ongoing development of these technologies, space has been gradually established as a new musical parameter (Erruz, 2016, p. 1). Composing with audio and paying particular attention to the manipulation of spatial characteristics has been used extensively in the realm of sound art (Born, 2013, p. 17).

The 3D audio composer can move sounds in any direction on the horizon (azimuth) and also change a sound's perceived height (elevation). However, there are some constraints and technical points that can assist the 3D spatial composer highlighted within Hancock's "Sonic Submersion. Artistic Research into 360 Audio" (Hancock, 2021). Sounds with low frequency content do not elevate well compared to mid or high frequency content (Hancock, 2021, p. 35).

Reverb can mask and dampen the perceived spatial positioning of elements although the use of pre-delay may allow the initial sound to come through and give the ear positional information before the reverb dampens the source (Hancock, 2021, p. 34). Bates (2016) also notes how using dynamic compression can have a damping effect in a spatial mix and that subtle use if any may be more appropriate (Bates, 2016, p.6).

The way our brains and ears function together can create spaces behind the listener where identifying sonic placement becomes unclear. Subtle movement of sound elements within these "cones of confusion" can help clarify the positional cues (Hancock, 2021, p. 36). As a 3D composer himself, Hancock also noted that he tended at first to overuse the positional and movement options at his disposal, something I also recognised with my own initial experiments, however through reflection on practice he found positioning things more statically and not over moving them helped to create what he calls "a more realistic environment and sense of immersion" (Hancock, 2013, p. 33). For myself however the main concern was the use of spatial movement to add interest as opposed to using spatial location to promote realism.

3D audio is used to create an immersive spatial audio experience in Virtual Reality (VR). Within VR, audio sources must be accurately positioned in terms of direction (azimuth) and height (elevation). The most popular spatial audio format for 3D audio is Ambisonics B-format. This does not encode loudspeaker information in the way 5.1 or 7.1 surround does and instead encodes the whole spherical soundfield around the listener's head. This means play back can occur on any loudspeaker system including headphones (Narbutt, 2020, pp. 1-2). Headphones are also the preferred listening experience for this soundscape so that a more immersive personal listening space may be achieved with spatial characteristics preserved.

So I know that for me at least, there is benefit in lying down, putting on headphones and taking time out to listen to a soundscape. I also know that the movement and placement of sounds within a soundscape can enhance that experience for me. I wanted to know why. In terms of a purely listening experience, how is it that sounds, music and voice prompts can give me a very real physical sense of peace and calm. And if movement could add to that then why? What could be going on? What benefits could there be that listening to audio can give us that could be enhanced with movement? These are some of the questions that inspired and provoked this Literature Review and thus informed the compositional artefact that accompanies this thesis.

The stressors associated with unenjoyable sounds and noise have been shown to reduce quality of life, disrupt sleep, reduce productivity and inhibit educational development (Westman & Walters, 1981, p. 306). Sound stimuli go far beyond simple communication for humans and play a crucial role in brain arousal thereby influencing and impacting the physiological functioning of the body (Westman & Walters, 1981, pp. 293, 305). Research on the ambient noise of hospital soundscapes found a very direct link between patient wellbeing and ambient sound (Born, 2013, p. 58). If sound and noise can affect us negatively, then it makes sense to infer that sound and music can benefit us positively too.

However, is it a reasonable expectation that people may slow down and relax as a result of what they are listening to? Or is it just that taking the time out to lie back with headphones on is a restful event by itself? Can sound and music be used to help people in a very real biological sense? Does music really impact us emotionally, mentally or physically or is it just pleasing to us when we think it sounds nice and displeasing when it doesn't? If it does have real

benefits for us, then the literature should reflect it being used as a therapeutic tool in the medical sector.

Over the last decade Virtual Reality and Virtual Reality Hypnosis have been used effectively to assist with phobia reduction, anxiety treatments and for pain relief (Askay et al, 2009, p. 40; Rousseaux et al, 2020, pp. 1130-1131). The immersive capabilities of VR have been demonstrated to be effective in medical settings to provide intense cognitive distraction during brief, painful procedures and when treating burn patients (Sharar et al, 2008, p. 2). It would seem the VR user benefits from distracted attention and deeper immersion whether trying to experience relief from medical complications, pain or phobias, general relaxation or simple enjoyment from their favourite game.

Spatial audio has become a growing compositional medium in recent years in large thanks to its use in Virtual Reality. 3D audio is considered essential to deepening immersion in a VR setting (Susal et al, 2016, p. 7). When wearing a VR headset and moving the head to look in any direction then one also expects to be able to see correlations between positional objects and their sounds in space (Susal et al, 2016, p. 1). Sounds come to us in 360 degrees from every direction on a daily basis and hence we cannot suspend disbelief for immersion in a virtual environment if we are forced to hear sound placements only from in front of us and to the sides.

Music by itself, without a VR or spatial element, is documented as being of benefit to our mental and physical health (DeNora, 2013, p. 4). Musical interventions as music and/or music therapy have been shown to have beneficial effects on medical conditions as varied as pain intensity, emotional distress, heart rate, blood pressure, respiration rate and in reducing levels of

needed opioid or anaesthetics (Lee, 2016, p. 471). So we know that music and sound can indeed affect us. But what about our minds? Can music and sounds also enhance "mindfulness"?

In efforts to formulate an operational definition for the field of psychology, Bishop et al (2004) describe mindfulness as " bringing a certain quality of attention to moment by moment experience" (Bishop, 2004, p. 230) and discuss the use of mindfulness in contemporary psychology as an approach to increasing one's awareness of mental processes, emotions & behaviours. Seabrooke et al (2020) introduce the established understanding that regular mindfulness practice has the potential to be beneficial for mental health. They further cite environmental and personal distractors as common challenges in mindfulness practice and how the immersive environment of Virtual Reality may help the user to better bring their attention to the present moment. The participants of their research reported that Virtual Reality helped them to focus better into the present moment by its use of both visual and auditory elements as attentional anchors (Seabrooke et al, 2020, p. 1).

An attentional anchor is any element in our awareness that assists to hold the brain's attention in the moment. They are stimuli our brain can latch on to. If it is interesting enough it will sustain attention. Robertson et al. (1997) define sustained attention as "the ability to self-sustain mindful, conscious processing of stimuli whose repetitive, non-arousing qualities would otherwise lead to habituation and distraction to other stimuli" (Robertson, 1992 cited by Malinowski, 2013, p. 5). Habituation is when a stimulus stops becoming novel and ceases to anchor our attention. Our brain stops noticing it and it becomes background. When our brain stops being anchored it wanders and when it wanders we are unable to maintain mindfulness. Brown et al (2007) define mindfulness as "a receptive attention to and awareness of present events and experience" (Brown et al., 2007 cited by Malinowski 1997, p.2)

The shifts and changes in musical form and song structure hold the brain's attention. Sounds can too. Movement of sounds could also. Being able to move sounds spatially in a sphere around the listener as opposed to pan placement left and right is known as 3D Audio, Immersive Audio or Spatial Audio. Tom Middleton, a 3D audio composer who has created works in the format to assist people with insomnia, believes that spatial audio can help people to relax more than conventional audio. In interview with Griffith (2022), Middleton goes on to add that:

> *In mindfulness practices there's this thing called the 'power of presence', being 'in the now', 'in the moment' – to stop thinking about the past and the future and just be present in the moment. Spatial audio amplifies that sense of presence. Listening to music is lovely but sometimes your mind might still wander. But with spatial audio a piano can be positioned precisely in a room space and it's more believable. You feel like you're in that space, and that creates a more active listening experience and deeper engagement.* (Middleton, in Griffith, 2022, para. 18)

I have selected to mix elements of this project's audio using spatial techniques because I agree with Middleton that the medium can create deeper engagement and deeper immersion. Immersion matters to me because the more immersed someone can be in a listening experience that seeks to calm and relax them, then perhaps the more they will benefit from the experience and be more open to positive suggestions that may be contained within and hopefully sleep better that night as a result.

The literature, reflection and experimentation assisted to inform both the processes of constructing an immersive mix and the potential benefits for a listener to enjoy time out, solace, refuge and mindfulness in a sonic experience akin to what De Nora describes as "Musical Asylum" (DeNora, 2013, p. 136). It is my hope and intention that the soundscape will lead the listener to a place of 'musical asylum', where the spoken word prompts, sounds and movement can assist them to find a place of beneficial relaxation and mindfulness.

Research also shows that listening to music impacts our brains. In his book "Your Brain on Music", Dr. Daniel Levitin (2007) discusses with reference to neural science and psychology how the brain is drawn to music and how listening to music affects many areas of our brain including both the oldest and most recently evolved parts. Music, he argues, taps into the parts of our brain for speech, for emotional regulation and memories, and triggers an expectation and reward system that ultimately releases dopamine, a natural mood elevator (Levitin, 2007, pp. 163, 259). Levitin further makes the case that when listening to music, subtle variations and violations in expectations regarding the structure of the sounds and musical elements comprising a piece give our brains pleasure (Levitin, 2007, p. 187).

As the music unfolds, the brain constantly updates its estimates of when new beats and changes will occur. The brain takes satisfaction in matching a mental beat with an audible one and takes delight when a skillful musician violates that expectation in an interesting way. Music moves and fluctuates and our cerebellum finds pleasure in adjusting itself to stay synchronised (Levitin, 2007, p. 188). Christensen's (2018) book "Sound and the Aesthetics of Play" pulls together work from scientists and researchers that adds further weight to Levitin's (2007) reflections on the brain's ability to predict tempo and rhythm and song structure whilst listening to music. Christensen highlights wider

research that suggests that a moderate amount of complexity and syncopation, "groove," assists in holding attention and engagement through providing novel stimuli for the brain to follow and predict. For example with rhythm, too much or too little "groove"can reduce the pleasure response garnered through listening to the music (Christensen, 2018, pp. 107-108).

There is a Goldilocks' zone. I have to wonder if this could also be the case in terms of the movement of sounds around the spherical listening space that 360 degree audio allows. Perhaps keeping some elements static to prevent confusing the listener as Hancock advises (Hancock, 2013, p. 33), while using movement to add an extra attentional element to others. I decided to keep some tracks static, namely some of the ambient sounds achieved through local field recordings and then added movement to others. Even though such movement may be novel to the brain at first, perhaps it soon learns that certain elements are moving in a certain way. Perhaps it can then follow and predict that movement much like it can predict rhythmic structure. And then subtle unexpected violations of that movement may cause further interest, pleasure and holding of attention. Almost like adding 'groove' to the movement of the sound.

The intention here with this work is to see whether moving certain elements within a spherical soundfield could hold the brain's attention in such a way as to provide additional immersion on top of that afforded by usual pan placement and content alone. The potential for the brain to follow spatial movement is assisted by the fact that the listener can focus attention easily on sound objects that vary in spatial location and frequency (Alain & Arnott, 2000, p. 208).

This literature review has shown that music and sound are used extensively in a range of medical settings and that music can affect us beneficially. The review further explored technical aspects relating to the definition and composition of spatial music, where a spherical soundfield exists around the listener. The spatial composer uses technical know-how to enhance the spatial characteristics of sounds and add movement to them. The review further illustrates how fluctuations, changes and 'groove' in music add interest to the listening experience and help us stay attentive. Spatial movement could further assist the listener to be aware of and latch onto sounds within the audio. This latching on is akin to the brain anchoring to sonic elements as they present and move. If movement can add another element of 'groove' then the question provoked is could the brain latch on to, anchor and be immersed in listening to sounds better as it follows the movements ? It might enjoy following the sounds as they move, that 'latching on' holding the brain's attention in the present moment and thus deepening a sense of mindfulness and relaxation. An additional attentional demand that could lead the listener into a deeper, more immersed place, deeper into the sanctuary of 'musical asylum'.

In the following chapter on Methodology I have outlined the tools and techniques used to realise the soundscape tracks and have focussed on the processes of and reflections on movement manipulation as opposed to composition. The spatial audio tools and techniques used enabled me to move the sounds (tracks) in real time and record that movement as 'automation' onto the tracks in a DAW (Digital Audio Workstation or Sequencer). I have kept the composition relatively simple to make it easier for the listener to be aware of audible changes in location. The soundscape incorporates only a handful of elements : a guitar track, spoken voice recordings and field recordings with some use of software plugin effects to add interest.

Methodology

This project was guided by Nelson's (2022) epistemological model for Practice as Research which involves ongoing reflection on three key areas of knowledge which Nelson coins, 'Know How', 'Know What' and 'Know That' (Nelson, 2022, p. 46). Exploring the literature with a research question is the "Know That" realm of the methodological process, in terms of knowing that this person did this or that person's research found that for example.

Nelson's 'Know How' (Nelson, 2022, p.46) is akin to previous learned skills and knowledge the practitioner brings to the project. I shall endeavour to itemise the processes, tools and technology I have used for experimentations and composition and reflect upon them. The best way to do this I feel is to discuss the individual tracks in the composition and reflect upon the motivation and processes behind their use - "the "Know How" of actual production. "Know What" is reflecting on the creative process that was inspired by literature review in terms of knowing what seemed to work and what did not and why even if it is only tacit reflection.

The practice-led inquiry guided by Nelson's (2022) epistemological model required a literature review of current research and media focused on a

specific research question (Know That). The literature review then informs creativity and experimentation in practice (Know What). The research question I explored with both the review and the subsequent creative audio artefact was: could the movement of sounds increase the immersion and mindfulness of the listener? After completing the Literature Review, I then set about gathering field recordings and musical elements for the piece. Once I had a selection of potential sounds and recordings I would experiment using spatial plugins to see which sounds seemed to move well and which perhaps were better stationary or left stereo. Other experiments included the addition of reverb and other sound effects, pre and post spatial plugins in an effort to add further interest to the listening experience.

The reflections in this exegesis draw on a creative stage which included iterative music compositions within spatial 360-degree audio. For spatial audio mixing I used a MetaQuest2 VR headset with hand controllers, the DAW sequencer Reaper, and the spatial plugin DearVR Pro (enables spatial movement via ambisonics). An additional plugin, DearVR Spatial Connect, creates a 360 degree virtual mixing room inside the Virtual Reality headset and also acts as a bridge between the DearVR Pro spatial plugin in the DAW and the VR headset and controllers. This creates a virtual spherical mixing space that can be accessed using a VR headset and connects the spatial plugin inside the DAW to the virtual mixing room. This allows me to use the Meta Quest's hand controllers to literally grab on to sound objects and move them around, recording their movement as automation within Reaper as I do.

There is a video link of my own from an earlier project in the appendix that demonstrates through a video recorded inside the VR headset the processes involved. It is much easier to understand when you can see it in action. I was unable to create videos of the live production process for this

project sadly for technical reasons with the hardware. Experiments with all tracks explored manipulating the structure by slowly moving elements in terms of both azimuth and elevation and distance. This was initially conducted using the software in desktop mode to get a feel for how certain elements worked and sounded tacitly as a precursor to mixing and playing with the tracks inside virtual reality. VR mixing requires a headset and the use of hand controllers so it helps to have things a little set up and tested in advance to make life easier.

Personally I have for decades now at times thoroughly enjoyed and even found comfort and rest from using guided meditation and self hypnosis style audio with spoken voice prompts to aid in the process of unwinding. Spoken word suggestions have been used widely in the realm of hypnotherapy and guided meditation. Rousseaux et al (2020) define hypnosis as a state of focused attention with reduced peripheral awareness, characterised by an enhanced capacity for response to suggestions (Rousseaux et al, 2020, p. 1130).

I felt that adding hypnotic induction vocal style elements would work well in the piece as I am also adding additional attentional elements for the brain to focus on with the movement so the two I felt would work well together. The vocal dialogue tracks were recorded mono using a Rode NT1 Microphone. For audio editing tasks I used the audio editor Sound Forge and also Izotope's RX Audio Editor for cleaning up recordings prior to use in the DAW. Within the DAW I then experimented with movement just using the mouse and/or drawing in the automation but found using the controllers gave a much better sense of organic movement. For me at least it is the only way I have found to really manipulate a sound's azimuth, elevation and distance all at the same time. I would need another hand to try to affect all three of those parameters in real time using just the DAW even if I was using midi controllers.

Research on the effects of loudness on listeners showed that increases in volume created an increase in both perceived time as well as perceived pace (Kellaris & Altsech, 1992, p. 1). Volume then can not only impact the perceived time of a piece but also adds an attentional element as does anything that subtly changes over time. Being able to manipulate the movement across the horizon (radius or azimuth) and elevation (perceived height) at the same time as manipulating the volume (distance or proximity of the sound) is only doable in a hands-on organic fashion using the combination of the VR hand controllers with the VR headset and virtual mixing room. The hand controllers also have thumb joysticks that enable you to move the 'grabbed' sound object closer and further away as you are moving it spherically around the internal listening space.

I duplicated the main dialogue track and passed it through a soft synth vocoder. I wanted a higher frequency element that could accompany the main voice in an effort to make it easier for the brain to follow changes in perceived height of that sound. Research shows that sound elements with a predominantly low frequency, such as the main voice, do not elevate well compared to higher frequency content (Hancock, 2021, p. 35). The more 'wispy' vocal element almost sounds like a female whispering and I liked that contrast too.

I recorded the main vocal movement and the wispy vocal track movement at the same time, holding onto each track in VR using the hand controllers, one on each. With them I can rotate them and move them around, up and down and nearer or farther away both tracks at the same time and have

the movement recorded as automation. An additional vocal track was recorded separately and can be heard as a second voice moving in contrast to the main.

The Artefact

The Slow Down Sound Scape can be listened to or downloaded from this link.

[Redacted]

The soundscape is best listened to on headphones to appreciate the spatial mix. The soundscape runs for 25 minutes and will hopefully guide the listener to a place of relaxation or even sleep so a comfortable listening position away from distraction is best.

Compositionally there is an introduction that is just guitar, effects and rain and thunder ambience without any movement going on at all. After that, movement can be heard on different elements throughout the piece. Spoken voice can be heard after the intro after this, guiding the listener to relax and unwind. Guitar continues to be heard moving in the background and other ambient sounds have been created using either field recordings as they are or

with the addition of effects to create some ethereal 'washy' sounds too. The soundscape and dialogue breaks down and only the pulsing pad sound and bongos take over for a little while with some dawn chorus and river sounds before more vocal dialogue and guitar and field recordings resume that take us to the end.

Critical Reflections on Content

Exposure to sounds of nature has been shown to help with physiological recovery after stress (Alvarsson et al, 2012, p. 12). To give the listener a sense of reconnecting with nature I wanted to include natural ambiences. Nature field recordings might remind us of our intimate connection with the wild and perhaps assist the listener to have an experience of being in another space, another reality. This may help to remember or awaken the notion that there are multiple realities and ways of perceiving and being and that our everyday lived reality is often just one conditioned choice that perhaps leaves us feeling out of touch with the natural world. For the purpose of this project I purchased a mobile Zoom H6 stereo recorder. I am lucky enough to live a simple off grid life with a river to cross as my only means of access and National Park on the other three sides.

There are several tracks comprising elements from field recordings for this project using the Zoom H6 Portable Stereo Recorder with wind breaks. Field recordings and hence track elements were gathered and experimented with from a variety of locations in my surrounding area, by the river, in the forest, thunderstorms, rain, path walking and dawn chorus. All nature sounds and samples in the soundscape are from those recordings. I found the stereo recording that the Zoom H6 gives had enough of a sense of ambience and space to it by itself. Turning it into a mono file so that it can be moved spatially seemed to dampen its natural ambience. Only mono tracks will work with the Dear VR Pro spatial plugin in terms of audible movement.

Some of the recordings from the river I experimented with spatially, moving a looped 8 bar recording of water sounds in such a way as to give the sensation of waves gently washing around us on a beach. I liked this sound so much and found its movement gave a very realistic sense of having water moving around you and as such it can be heard permeating through much of the soundscape. I find it hypnotic and water being water it seems naturally conducive to changes in 'flow' realised through the addition of movement. Perhaps the higher frequency content assists but I also think it's something to do with the natural movement of water too.

The river field recording was a stereo file. I separated the recording into two mono tracks for experimentation so that each could be moved separately. For the water I experimented with a different technique to using the hand controllers. I wasnt so much aiming for any elevation of the sound I simply wanted the sense of it gently lapping around the listener. So I used an LFO attached to the azimuth parameter of the Dear VR Pro plugin in Reaper to

create a circular movement on each mono track. One going one way, one the other and found this quite effective. One of the tracks had a reduced volume to allow the movement to be more audible.

Perhaps our brains are so used to the sound of water as a moving entity that it's easy for us to accept it moving spatially on playback. I found it relaxing and hypnotic and decided to have it audible through a fair bit of the soundscape as a result. Some bird and nature sounds had movement, but I definitely felt that a more natural sense of space was achieved by keeping them predominantly as stereo files and not turning them into mono so they could be moved. Dawn chorus recordings of bird song and sounds of rain and thunder and forest I kept as stereo files so that their natural ambience could be heard as opposed to narrowing that ambience down to mono to facilitate movement.

I wanted to have a musical element other than field recordings and voice. Research indicates that when we listen to music a skillful musician is actually violating our brain's expectation in an interesting way of what we might be hearing next or where a musical melody may flow (Levitin, 2007, pp. 187-188). Musical complexity and syncopation assists in holding attention and engagement through providing novel stimuli for the brain to follow and predict (Christensen, 2018, pp. 107-108). The guitar track was recorded raw as an improvised track by my son Brody. I asked him to play something calm and relaxing that I could use for the piece. The guitar track does have movement recorded and also has a reverb/delay tail added to that which moves with it. As the reverb was added prior to the guitar tracks movement then its damping effect on spatiality was minimised, and I like the sound of the diffuse reverb setting as it adds interest and effect.

Digital connectivity offers wider scope for collaborative options and can be used to share segments with others for adding their own additional improvised elements. Brody sent me the guitar track raw via the web. Adding improvised music I feel assists the project to have a more complex 'tapestry of sound' that expresses both the 'individual identity of the contributors but also the group identity' (Wren, 2014, p. 59). Perhaps representing a collective coming together, perhaps adding weight to the project's meme, concepts and intentions, more so than a solely individual offering alone.

Certain types of sounds have been shown to impact us negatively in some situations, other sounds, music and music therapy give our brain's pleasure and can assist in medical therapeutic settings.Sounds from nature have been used therapeutically in medical settings and adding them to the soundscape I feel added an element of being in another place as well as the natural groove and fluctuations in birdsong already present. Some sounds are best kept stationary perhaps to stop overloading the brain with attentional demand and to allow the moving sounds a chance to be anchored to. I chose to keep the nature recordings stationary and move the dialogue and guitar, however I did add movement to a river / water recording and found that water sounds are very effective in giving spatial cues, perhaps due to the high frequency content as the literature suggests.

3D or spatialized audio is considered essential for immersion in the gaming sector.   I believe that moving the sounds spatially in a soundscape complements the pleasure we garner from variations in the music itself and adds even further immersion. I find it very easy to anchor onto the movement of sounds in the piece and also find the movement helps stop my brain from wandering 'outside' of the listening experience,   The literature also informed compositional practice in terms of awareness of frequency and its

impact on elevation as well as the potential damping impacts of compression and reverb on spatial location. I found through experimentation that moving the objects with the hand controllers in the virtual mixing room seemed to give a much richer organic natural sense of movement. The literature on mindfulness and attention informed me to choose this method as the more organic variations in the movement could assist to stop the attentional aspect of following them from becoming habitual.

The brain likes matching a mental beat with a real one so I wanted to have rhythmic elements. It is my hope that by incorporating a little of everything the listener may be able to decide for themselves which sounds they enjoy appreciating the movement with whether musical, voice, nature or rhythmic element. It was my hope that by doing so the creative composer may better decide for themselves any elements they may wish to experiment with in their own creative play.

The bongo track and pulsing synth sound in the more central breakdown in the soundscape are from software synthesisers and instruments. It is almost imperceptible but the tempo of the pulse and percussion sounds wanes over time. To do this I first created them in their own separate sequencer track with several other tracks including drums and bass and adjusted the global tempo on the master track so they all slowed down over time. However on reflection I liked the simplicity of just using the two elements as I feel space is sometimes just as important as sound itself. So after rendering the two tracks with the reducing tempo I then moved them spatially.

For all of my composing and mixing I use ATH M50x headphones for playback. To appreciate the spherical nature of sound placement and sound

movement of 3D audio, headphones are the preferred listening medium unless you have access to an expensive surround system. Mix Immersive Audio infer that more than 90% of consumers listen to immersive audio through headphones (Mix, 2023, para. 4). The piece was designed for people to lie down and relax while listening for a while so headphones made the sensible choice for all mixing work.

Once all the tracks had automation recorded they were rendered as separate tracks and then rearranged using Ableton Live as for some tasks I find it easier to work with. Mastering was kept to a minimum in terms of dynamic adjustment as adding reverb to the master can impact the clarity of a sound's sonic location (Hancock, 2021, p. 34) as can over use of compression (Bates, 2016). Only a small amount of compression was added to the final mix simply to tame a few dynamic peaks while keeping the threshold low to prevent impacting the spatial information. The DearVR Pro plugin has its own spatial reverb and I used this instead of adding another spatial reverb to add space and aesthetic ambience as required.

Conclusion

In summary, I have introduced my personal interest in this project, namely to try to create an immersive spatial audio that may assist others to slow down and relax. I have reviewed the literature that informed my practice-led project in terms of wider concepts, the potential benefits of the audio artefact and in ways to effectively manipulate and compose it.

It is my hope that the experimentations, research and reflections that constitute the body of this work will inform any future mixed media creations of my own as well as that of others who have an interest in relaxation and ambient audio, 3D soundscapes, 360 audio, soundart, hypnotherapy and guided meditations and creators intending to use spatial audio as an accompaniment to the immersive potential of Virtual Reality or mixed media storytelling.

Reflection on my own tacit conclusions and perceptions lead me to believe that movement can indeed assist to give the brain additional anchors to focus upon. In many ways if it is subtle enough, for example not moving too fast or too distractively then perhaps it would be more difficult to argue that it wasn't able to do so. I feel there is definitely potential for future creative experimentations and creations in the field of spoken dialogue relaxation recordings mixed with spatial audio.

This paper and its accompanying audio piece explored the potential deepening of immersion through adding an attentional element via movement to the sounds and music in an audio soundscape. The paper argued through literature review and reflection, and demonstrated through its audio content, that adding spatial movement to audio material gives the brain additional attentional anchors to follow and assists in deepening immersion as a result.

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APPENDIX A

This video is my own from 2022 and demonstrates some of the process of Using a Windows PC running Dear VR Spatial Connect, Oculus Software and the digital audio workstation, Reaper. Then using a Quest2 Headset to access the PC desktop through Oculus and to run the Spatial Connect App inside Oculus via the headset and Oculus Link Cable. The video was recorded by the headset.

▶ 3D Audio Spatial Connect Mix

Blackman, N. (2022). *3D Audio Spatial Connect Mix*. Youtube video . Accessed via https://youtu.be/LWz1gjUbtFU